U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-260 352

WATER QUALITY SURVEY HAW RIVER SUB-BASIN CAPE REAR RIVER BASIN

FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
CHARLOTTESVILLE, VIRGINIA

1969

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PB 260 352

U.S. DEPARTMENT OF THE INTERIOR

FEDERAL WATER POLLUTION

CONTROL ADMINISTRATION

MIDDLE ATLANTIC REGION

PENNSYLVANIA

MARYLAND

DISTRICT OF COLUMBIA

VIRGINIA

NORTH CAROLINA

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The results of a survey to determine the physical, chemical, and biological characteristics of the Haw River, Reedy Fork Creek, and Buffalo Creek system in North Carolina are presented. The data is to be used to develop an oxygen-sag mathematical model of the streams, to determine the waste assimilation capacity of the Haw River and its major tributaries, and to define water quality conditions for the water upstream from the proposed Corps of Engineers New Hope Reservoir.

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WATER QUALITY SURVEY

HAW RIVER SUB-BASIN

CAPE FEAR RIVER BASIN

SUMMER 1969

DATA REPORT NO. 3

Federal Water Quality Administration
Middle Atlantic Region
918 Emmet Street
Charlottesville, Virginia 22901

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HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

DATA REPORT

I. PURPOSE

The purpose of the survey was to determine the physical, chemical, and biological characteristics of the Haw River, Reedy Fork Creek, and Buffalo Creek system. The data collected will be used to develop an oxygen-sag mathematical model of the streams, to determine the waste assimilation capacity of the Haw River and its major tributaries, and to define water quality conditions for the water upstream from the proposed Corps of Engineers New Hope Reservoir.

II. SCOPE

Surveys were conducted during August, September, and October, 1969 to define water quality during low flow conditions. These surveys consisted of the sampling and analyses thereof of 26 stream stations and 10 reservoir stations on small run-of-the-river reservoirs. The streams were sampled for the following parameters: temperature, DO, BOD, pH, total organic carbon, total and fecal coliforms, heavy metals, nutrients, pesticides, and methylene blue active substances. In addition, bottom fauna were sampled at each station to determine the biological response to existing water quality conditions.

The impoundments were sampled for temperature, DO, BOD, pH, alkalinity, nutrients, diurnal and primary production data, phytoplankton, benthic organisms, volatile solids of muds, and bottom oxygen demand.

Stream discharge measurements and rating tables and the results of a time-of-travel study were provided by the U.S. Geological Survey.

III. PROCEDURES

The impoundments were sampled for 4 days in August and 3 days in September. Diurnal data was obtained by sampling every 6 hours for 24 hours. Primary production data was obtained by suspending light and dark bottles at various depths for specific periods of time. The bottom oxygen demand was measured by an in situ benthic respirometer.

The stream stations were sampled at a different time each day to account for daily variations in waste discharges and normal diurnal changes in water quality.

Dissolved oxygen, BOD, and pH analyses were performed at the East Burlington Waste Treatment Plant laboratory. Bacterial samples were examined in the National Field Investigations Center's mobile laboratory located at the treatment plant, while TOC, heavy metals, nutrient, and pesticide samples were shipped to Cincinnati for analyses. Methylene blue active substances were determined by the N. C. Department of Water & Air Resources.

Reservoir phytoplankton and benthic samples were returned to Charlottesville for analyses, and the volatile solids were sent to the NFIC laboratory in Cincinnati.

All analyses were performed in accordance with either Standard Methods for the Examination of Water & Wastewater or FWPCA Methods for Chemical Analysis of Water & Wastes.

IV Station Description

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HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

Station Number	Stream Name	River Mile	Location
6	Haw River	57.7	County Road 1561 Bridge near Altamahaw, N.C.
8	Ready Fork Creek	8.8	County Road 2719 Bridge near Monticello, N.C.
9	North Buffalo Creek	12.9	U. S. 220 Bridge in Greensboro, N.C.
10	North Buffalo Creek	9.7	Culvert under U. S. 29 near Greensboro, N.C.
11	North Buffalo Creek	4.5	County Road 2832 Bridge near Greensboro, N.C.
12	South Buffalo Creek	12.4	County Road 3300 Bridge in Greensboro, N.C.
13	South Buffalo Creek	10.7	U. S. 421 Bridge in Greensboro, N.C.
14	South Buffalo Creek	8.3	N. C. 6 Bridge near Greensboro, N.C.
15	South Buffalo Creek	7.3	County Road 3000 Bridge near Greensboro, N.C.
16	South Buffalo Creek	4.0	U. S. 70 Bridge near Greensboro, N.C.
17	South Buffalo Creek	1.2	County Road 2821 Bridge in McLeansville, N.C.
18	Buffalo Creek	6.7	County Road 2795 Bridge near McLeansville, N.C.
19	Reedy Fork Creek	4.9	N. C. 61 Bridge near Gibsonville, N.C.

IV Station Description

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HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

Station Number	Stream Name	River Mile	Location
20	Reedy Fork Creek	0.8	N. C. 87 Bridge in Ossipee, N.C.
21	Haw River	55.7	County Road 1530 Bridge near Ossipee, N.C.
24	Haw River	53.0	County Road 1530 Bridge near Burlington, N.C.
25	Haw River	49.0	County Road 1700 Bridge in Hopedale, N.C.
27	Haw River	45.5	U. S. 70 Bridge in Haw River
28	Haw River	43.9	I-85 Bridge near Graham, N.C.
29	Haw River	42.1	N. C. 54 Bridge near Graham, N.C.
31	Town Branch	0.1	County Road 2109 Bridge near Graham, N.C.
34	Back Creek	0.4	N. C. 54 Bridge near Graham, N.C.
35	Haw River	40.6	County Road 2158 Bridge in Swepsonville, N.C.
V1	Haw River	40.4	Swepsonville Impoundment 400 ft. downstream from washed out Virginia Mills dam.
V2	Haw River	40.3	Swepsonville Impoundment 700 ft. downstream from washed out dam.
V3	Haw River	40.1	Swepsonville Impoundment 200 ft. downstream from Virginia Mills waste outfall.

IV Station Description

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HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

Station Number	Stream Name	River Mile	Location
V4	Haw River	40.0	Swepsonville Impoundment 50 ft. downstream from confluence of Alamance Creek and Haw River
V5	Haw River	39.3	Swepsonville Impoundment 400 ft. upstream from dam.
L4	Haw River	37.95	Saxapahaw Impoundment 3.45 miles upstream from dam.
L3	Haw River	36.8	Saxapahaw Impoundment 2.3 miles upstream from dam.
L2	Haw River	36.5	Saxapahaw Impoundment 2 miles upstream from dam.
L1	Haw River	34.7	Saxapahaw Impoundment 1300 ft. upstream from dam.
45	Alamance Creek	2.1	N. C. 87 Bridge near Graham, N.C.
A-1	Alamance Creek	0.1	County Road 2116 Bridge
47	Haw River	34.2	County Road 2171 Bridge in Saxapahaw, N.C.
48	Haw River	28.4	County Road 1005 Bridge near Saxapahaw, N.C.

TABLE 1

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HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

CHEMICAL DATA

DATE	TIME	TEMP °C	GAGE HEIGHT	FLOW cfs	pH	DO mg/l	DO % Sat.	BOD2 mg/l	BOD5 mg/l	BOD5 #/day	TOC mg/l
					Station 9						
August											
14	0740	23	14.20	13(1)	6.8	6.1	70	1.1	3.3	232	-
15	0945	25	17.40	2.5	6.9	6.5	78	0.8	1.4	18.9	-
16	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-
18	0530	25	17.40	2.5	7.4	6.0	72	0.8	1.3	17.6	4
19	0325	26	17.45	2.3	7.4	5.6	68	1.1	2.0	24.8	-
20	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-
22	0920	21	17.45	2.3	6.7	6.1	68	1.2	2.4	29.8	-
					Station 10						
August											
14	0945	26	19.10	21	9.1	5.0	61	DEPL.	DEPL.	-	-
15	1100	29	19.30	8.8	8.2	3.5	45	6.4	DEPL.	-	-
16	1235	27	19.30	8.8	8.0	1.7	21	22.8	38.5	1830	-
17	1200	27	19.30	8.8	7.7	3.2	40	11.0	22	1050	-
18	0700	27	19.30	8.8	7.9	2.3	28	11.0	20	952	-
19	0450	29	19.35	7.0	9.4	1.6	21	29.5	54	2040	-
20	0220	29	19.10	21	8.5	0.6	8	71	DEPL.	-	-
21	1650	30	19.35	7	8.3	0.5	7	53	DEPL.	-	-
22	1035	26	19.25	11.3	8.6	1.1	13	24	70	4270	-

(1) An estimate: stage was above rating.

1969

HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

CHEMICAL DATA

DATE	TIME	TEMP °C	GAGE HEIGHT	FLOW cfs	pH	DO mg/l	DO % Sat.	BOD_2 mg/l	BOD_5 mg/l	BOD_5 #/day	TOC mg/l
					Station 11						
August											
14	1035	24	2.29 *	37	7.0	0.4	5	12.2	DEPL.	-	32
15	1130	26	2.17	28	7.3	0	0	DEPL.	DEPL.	-	-
16	1300	26	2.22	32	7.4	0	0	21.5	36	6230	46
17	1220	26	2.19	29	7.4	0.7	9	6.5	13	2040	-
18	0720	25	2.10	23	7.6	1.4	17	4.0	7	870	23
19	0510	27	2.15	26	7.3	0.1	1	10	17	2380	-
20	0240	27	2.17	28	7.3	0.6	7	13	21	3180	40
21	1720	27	2.25	24	7.6	0	0	20	33	4280	-
22	1105	23	2.07	21	7.2	0	0	33	51	5800	-
					Station 12						
August											
14	0700	23	17.20	7.8	6.9	3.1	36	DEPL.	DEPL.	-	18
15	0915	23	17.50	1.9	6.8	0.4	5	DEPL.	DEPL.	-	-
16	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-
18	0500	24	17.35	4.0	7.3	3.5	41	5.5	6.0	129	12
19	0245	25	17.55	1.5	7.2	3.5	42	6.5	9.5	77	-
20	1255	26	17.45	2.5	7.0	0.1	1	DEPL.	DEPL.	-	-
21	1420	28	17.43	2.7	6.8	3.0	38	8.5	15.5	226	-
22	0855	21	17.50	1.9	6.7	0	0	20	43	442	-

* U.S.G.S. Gage

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CAPE FEAR RIVER BASIN

CHEMICAL DATA

DATE	TIME	TEMP °C	GAGE HEIGHT	FLOW cfs	pH	DO mg/l	DO % Sat.	BOD_2 mg/l	BOD_5 mg/l	BOD_5 #/day	TOC mg/l
					Station 13						
August											
14	0630	23	13.40	27	6.3	0.4	5	DEPL.	DEPL.	-	30
15	0900	23	13.30	3.3	6.1	0.6	7	DEPL.	DEPL.	-	-
16	1005	25	13.75	4.6	6.1	2.6	31	9.5	14.5	365	21
17	1445	29	13.22	57	7.6	3.2	41	15.2	25.8	7950	-
18	0430	25	13.70	6.2	6.4	2.5	30	10.3	14	470	17
19	0220	27	13.75	4.6	6.3	3.8	47	10.0	16	397	-
20	1215	26	13.90	1.5	6.1	3.1	38	17.0	27	219	21
21	1400	27	13.75	4.6	6.3	3.1	38	14.5	24	595	-
22	0840	21	13.80	3.3	6.2	0.1	1	48.0	DEPL.	-	-
					Station 14						
August											
14	0920	24	11.85	(2)	6.5	0.0	0	DEPL.	DEPL.	-	-
15	1040	27	12.13	-	6.7	1.5	19	DEPL.	DEPL.	-	-
16	1135	27	12.10	-	6.5	0.8	10	40	70.5	-	-
17	1150	27	12.13	-	6.8	0.9	11	28	57	-	-
18	0645	26	12.10	-	6.9	1.7	21	27	51	-	-
19	0440	27	12.05	-	6.9	0.0	0	31	47	-	-
20	0200	27	12.15	-	6.7	1.7	21	18	50	-	-
21	1550	29	12.05	-	6.7	2.0	26	32	68	-	-
22	1015	24	12.15	-	6.4	0.6	7	44	93	-	-

(2) Not rated

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HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

CHEMICAL DATA

DATE	TIME	TEMP °C	GAGE HEIGHT	FLOW cfs	pH	DO mg/l	DO % Set.	BOD_2 mg/l	BOD_5 mg/l	BOD_5 #/day	TOC mg/l
					Station 15						
August											
14	0900	24	11.60	(2)	6.4	0	0	DEPL.	DEPL.	-	-
15	1020	26	12.10	-	6.7	0	0	DEPL.	DEPL.	-	-
16	1050	26	12.00	-	6.8	0	0	28.5	54.5	-	-
17	1135	26	11.95	-	6.9	0	0	47	80	-	-
18	0615	26	11.85	-	7.1	0.3	4	13	22	-	-
19	0415	27	12.15	-	6.9	0	0	11	23	-	-
20	0150	27	12.10	-	6.8	0	0	23	45	-	-
21	1530	26	12.00	-	6.6	0	0	27	53	-	-
22	1000	23	12.10	-	6.3	0	0	30	68	-	-
					Station 16						
August											
14	0815	24	-	-	6.7	0	0	DEPL.	DEPL.	-	-
15	1000	25	19.15	27.5	6.8	0	0	DEPL.	DEPL.	-	-
16	1030	26	19.05	30	7.0	0	0	24	47.5	7700	-
17	1120	27	18.90	32.5	6.9	0	0	20	46	8050	-
18	0600	25	18.90	32.5	7.1	0	0	18.5	24	4200	-
19	0355	25	19.15	27.5	6.9	0	0	28	38	5650	-
20	0135	26	19.15	27.5	7.0	0.1	1	7	18.5	2730	-
21	1510	29	19.09	28.5	6.7	2.4	31	16.5	26	4000	-
22	0940	23	19.15	27.5	6.7	0	0	20.5	47.5	7040	-

(2) Not rated

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HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

CHEMICAL DATA

DATE	TIME	TEMP °C	GAGE HEIGHT	FLOW cfs	pH	DO mg/l	DO % Sat.	BOD_2 mg/l	BOD_5 mg/l	BOD_5 #/day	TOC mg/l
					Station 17						
August											
14	1125	25	12.40	36	6.9	0.1	1	DEPL.	DEPL.	-	38
15	1155	25	12.70	21.5	6.9	0.9	11	13.5	DEPL.	-	-
16	1320	25	12.60	26.5	7.1	0.1	1	18.5	35.5	5070	42
17	1010	26	12.50	31	7.2	0	0	23	44	7360	-
18	0735	26	13.50	31	7.2	0.1	1	20	33	5500	35
19	0530	26	12.70	21.5	7.0	0.1	1	19	25.5	2970	-
20	0300	25	12.73	20.5	6.9	0.2	2	19	29	3210	23
21	1740	25	12.60	26.5	6.5	0.5	6	15.5	27	3870	-
22	1120	24	12.65	24	6.6	0.4	5	9.5	18.5	2390	-
					Station 18						
August											
14	1145	24	15.50	100	7.0	0.8	9	6.7	14.7	7940	-
15	1215	25	15.95	56.5	7.1	0.7	8	13.7	DEPL.	-	-
16	1335	25	16.00	50.5	7.4	0	0	20.8	DEPL.	-	-
17	1510	26	15.88	62	7.1	0.3	4	9.6	18.2	6100	-
18	0800	25	15.95	56.5	7.4	0.1	1	8.0	DEPL.	-	-
19	0540	25	16.00	50.5	7.4	0.2	2	12.5	21.0	5720	-
20	0315	26	16.05	45.5	7.4	0.5	6	6.0	15.0	3690	-
21	1750	25	15.95	56.5	7.0	0.8	10	6.0	12.0	3650	-
22	1140	22	16.05	45.5	7.0	1.4	16	6.5	13.0	3200	-

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HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

CHEMICAL DATA

DATE	TIME	TEMP °C	GAGE HEIGHT	FLOW cfs	pH	DO mg/l	DO % Sat.	BOD_2 mg/l	BOD_5 mg/l	BOD_5 #/day	TOC mg/l
					Station 19						
August											
14	1435	25	36.90	117	7.3	3.8	45	2.4	7.8	4930	-
15	1300	25	37.30	61	7.2	3.6	43	2.9	DEPL.	-	-
16	1420	25	37.35	55	7.4	3.3	39	4.3	DEPL.	-	-
17	1530	26	37.25	66	7.3	2.3	28	DEPL.	DEPL.	-	-
18	0830	25	37.30	61	7.7	2.3	27	3.8	DEPL.	-	-
19	0630	26	32.95	3000 (1)	6.9	4.9	60	3.2	7.1	115,000	-
20	0340	-	35.45	-	-	-	-	-	-	-	-
20	1225	25	37.00	34	7.1	4.9	58	3.5	6.8	3080	-
21	1820	25	37.15	78	7.0	3.7	44	3.8	9.6	4050	-
22	-	-	-	-	-	-	-	-	-	-	-
					Station 20						
August											
14	1310	25	29.90	128	7.3	5.7	68	3.5	8.0	5540	22
15	0850	23	30.03	106	7.4	5.7	66	3.6	DEPL.	-	-
16	0955	23	30.14	90	7.6	5.8	67	3.2	8.7	4230	18
17	1240	25	30.11	94	7.4	4.4	52	4.9	10.3	5230	-
18	0425	23	30.12	94	7.7	5.4	62	2.6	9.0	4570	19
19	0220	25	27.40	1230	6.9	5.3	63	4.1	9.1	60,500	-
20	1240	25	29.88	130	7.0	6.4	76	1.8	2.3	1615	15
21	-	-	-	-	-	-	-	-	-	-	-
22	0001	23	30.09	96	7.2	6.1	70	3.0	7.0	3620	-

(1) An estimate: stage was above rating.

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HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

CHEMICAL DATA

DATE	TIME	TEMP °C	GAGE HEIGHT	FLOW cfs	pH	DO mg/l	DO % Sat.	BOD_2 mg/l	BOD_5 mg/l	BOD_5 #/day	TOC mg/l
					Station 6						
August											
14	1500	25	16.95	32	6.7	7.7	92	1.2	1.7	290	10
15	0825	23	16.84	37	6.7	6.9	80	0.6	1.6	319	-
16	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-
18	0410	23	16.19	75	7.2	7.4	85	0.7	0.9	364	8
19	0200	24	15.99	89	6.3	7.5	88	0.8	1.8	864	-
20	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-
22	1120	-	-	-	5.9	-	-	1.1	2.7	-	-
					Station 8						
August											
14	1400	25	29.0	93	6.8	6.6	79	0.6	1.8	902	6
15	1230	24	28.95	100	6.3	6.5	76	1.1	1.7	920	-
16	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-
18	0815	23	27.30	445	7.1	6.5	75	0.6	1.4	3360	8
19	0600	26	22.65	2500 (1)	6.8	6.1	74	1.1	2.6	35,100	-
20	0330	-	27.75	325	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-
22	1155	23	28.80	120	6.4	6.7	77	1.7	2.8	1810	-

(1) Stage above rating: this is an estimate.

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HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

CHEMICAL DATA

DATE	TIME	TEMP °C	GAGE HEIGHT	FLOW cfs	pH	DO mg/l	DO % Sat.	BOD_2 mg/l	BOD_5 mg/l	BOD_5 #/day	TOC mg/l
					Station 21						
August											
14	0635	22	30.10	94	6.8	2.8	32	2.0	6.8	3450	-
15	0905	22	29.87	137	7.2	3.5	40	1.5	6.2	4600	-
16	1015	23	29.94	122	7.4	3.5	40	1.8	6.6	4340	-
17	1300	25	29.88	134	7.2	4.4	53	1.9	5.5	3980	-
18	0445	23	29.57	200	7.2	4.2	48	2.5	DEPL.	-	-
19	0235	24	26.75	1170	7.3	5.5	64	3.7	7.7	48,600	-
20	1255	24	28.87	380	6.7	6.3	74	1.5	3.9	8000	-
21	-	-	-	-	-	-	-	-	-	-	-
22	0010	23	28.79	405	6.7	6.3	73	1.8	4.2	9180	-
					Station 24						
August											
14	0705	22	28.05	97	7.2	2.0	23	2.4	6.2	3240	-
15	0930	23	27.82	152	7.2	3.1	36	2.2	7.6	6230	-
16	1030	23	27.90	133	7.3	2.6	30	1.9	5.5	3945	-
17	1310	24	27.88	137	7.2	3.4	40	2.9	5.4	3995	-
18	0500	23	27.57	215	7.2	3.5	40	2.0	7.6	8830	-
19	0250	24	25.12	890	7.5	4.9	57	6.8	DEPL.	-	-
20	1300	24	26.89	395	6.7	5.8	68	1.2	2.9	6190	-
21	-	-	-	-	-	-	-	-	-	-	-
22	0020	23	26.83	415	6.6	5.7	65	2.0	4.6	10,300	-

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HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

CHEMICAL DATA

DATE	TIME	TEMP °C	GAGE HEIGHT	FLOW cfs	pH	DO mg/l	DO % Sat.	BOD_2 mg/l	BOD_5 mg/l	BOD_5 #/day	TOC mg/l
					Station 25						
August											
14	0725	22	23.08	105	7.0	2.9	33	1.3	4.4	2485	14
15	1005	24	22.91	135	7.2	3.7	43	1.6	4.4	3210	-
16	1050	24	22.99	122	7.4	3.6	42	1.7	4.1	2700	14
17	1330	25	22.99	122	7.3	4.7	56	1.7	4.5	2960	-
18	0515	23	22.78	170	7.1	3.9	45	1.4	3.3	3030	13
19	0305	24	21.59	720	7.2	4.8	56	0.9	DEPL.	-	-
20	1320	25	22.29	330	6.8	6.4	76	1.4	3.3	5880	14
21	-	-	-	-	-	-	-	-	-	-	-
22	0035	23	22.27	340	6.6	6.2	71	2.0	4.0	7350	-
					Station 27						
August											
14	0800	24	1.86 *	98	8.1	2.8	33	DEPL.	DEPL.	-	-
15	1050	24	2.35	228	7.2	4.3	50	5.2	DEPL.	-	-
16	1130	25	1.98	136	7.4	4.2	50	4.8	8.4	6165	-
17	1420	25	2.03	147	7.4	4.6	55	2.2	4.2	3330	-
18	0530	24	2.20	186	7.4	5.0	59	2.4	3.2	3210	-
19	0325	24	4.80	1040	7.1	5.6	66	7.4	10.6	59,500	-
20	1340	26	2.99	415	6.6	5.9	72	6.0	10.0	22,400	-
21	-	-	-	-	-	-	-	6.6	9.6	-	-
22	0055	23	2.88	382	6.7	6.8	78	3.2	11.0	22,700	-
22	1150	-	2.74	-	6.7	-	-	-	-	-	-

* U.S.G.S. Gage

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HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

CHEMICAL DATA

DATE	TIME	TEMP °C	GAGE HEIGHT	FLOW cfs	pH	DO mg/l	DO % Sat.	BOD_2 mg/l	BOD_5 mg/l	BOD_5 #/day	TOC mg/l
					Station 28						
August											
14	0840	24	31.30	98 (3)	8.5	0	0	DEPL.	DEPL.	-	21
15	1150	25	30.82	228	7.5	3.5	42	5.6	7.9	9730	-
16	1210	25	31.16	136	8.0	1.4	17	6.6	11.6	8520	19
17	1430	24	31.20	147	7.4	3.6	42	2.2	6.2	4910	-
18	0640	25	30.94	186	7.6	3.9	47	3.4	6.5	6540	17
19	0350	24	29.67	1040	7.5	3.9	46	6.2	12.0	67,390	-
20	1420	25	29.89	415	6.8	5.8	69	3.6	6.4	14,300	18
21	-	-	-	-	-	-	-	5.6	8.0	-	-
22	0110	23	30.01	382	7.1	5.1	59	4.2	8.8	18,150	-
22	1210	-	-	-	7.0	-	-	-	-	-	-
					Station 29						
August											
14	0900	24	29.04	110	8.2	0	0	10.1	DEPL.	-	-
15	1215	25	28.43	330	7.5	1.1	13	5.5	7.9	14,100	-
16	1240	25	28.82	170	7.7	0	0	5.4	10.2	9,350	-
17	1440	25	28.97	128	7.4	3.3	39	3.8	6.6	4,560	-
18	0700	25	28.78	185	7.5	4.1	49	3.6	6.0	6,000	-
19	0425	25	27.89	640	7.4	2.5	30	4.6	9.0	31,100	-
20	1445	25	28.04	540	7.0	5.3	63	3.4	5.6	16,300	-
21	-	-	-	-	-	-	-	3.0	6.4	-	-
22	0130	23	28.13	480	7.0	4.8	55	3.2	5.6	14,500	-
22	1220	-	-	-	6.8	-	-	-	-	-	-

(3) Used same flow as 27.

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HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

CHEMICAL DATA

DATE	TIME	TEMP °C	GAGE HEIGHT	FLOW cfs	pH	DO mg/l	DO % Sat.	BOD_2 mg/l	BOD_5 mg/l	BOD_5 #/day	TOC mg/l
					Station 31						
August											
14	0925	21	19.18	- (4)	7.0	3.6	40	3.2	4.8	-	-
15	1240	24	18.34	- (1)	6.8	5.9	69	9.3	15.4	-	-
16	1250	24	18.61	- (1)	7.2	4.9	57	4.2	9.1	-	-
17	1455	26	18.93	12	7.2	5.1	62	5.3	12.1	785	-
18	0715	22	18.80	- (1)	7.2	5.3	60	1.6	2.6	-	-
19	0435	23	17.94	- (1)	7.3	1.9	22	6.3	11.5	-	-
20	1450	25	18.11	- (1)	7.1	1.3	16	DEPL.	DEPL.	-	-
21	-	-	-	- (1)	-	-	-	-	-	-	-
22	0140	21	18.56	- (1)	6.9	0.8	9	12.4	DEPL.	-	-
					Station 34						
August											
14	0910	22	31.82	- (2)	6.8	6.0	68	1.7	2.6	-	-
15	1205	23	31.51	-	6.8	6.8	78	1.9	2.5	-	-
16	1230	23	30.51	-	6.6	6.5	75	1.5	2.9	-	-
17	1445	24	31.31	-	6.8	6.4	75	1.2	2.1	-	-
18	0655	23	31.32	-	6.8	6.3	73	0.7	1.4	-	-
19	0415	23	31.58	-	6.8	6.1	70	0.8	1.8	-	-
20	1430	24	31.67	-	6.6	6.5	76	0.9	1.8	-	-
21	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-

(1) Stage above rating: this is an estimate.
(2) Not rated.
(4) Below rating.

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HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

CHEMICAL DATA

DATE	TIME	TEMP °C	GAGE HEIGHT	FLOW cfs		pH	DO mg/l	DO % Sat.	BOD_2 mg/l	BOD_5 mg/l	BOD_5 #/day	TOC mg/l
						Station 35						
August												
14	0950	24	26.02	170		7.7	0.7	8	8.4	14.4	13,200	22
15	1255	25	25.40	400		7.3	2.4	29	7.3	9.9	21,400	-
16	1315	25	25.51	350		7.4	2.5	30	3.6	7.4	14,000	18
17	1505	24	25.79	240		7.5	3.8	45	3.0	5.6	7,250	-
18	0730	24	25.69	275		7.3	3.9	46	2.8	4.2	6,200	16
19	0450	26	25.09	570		7.6	2.1	26	5.2	7.8	23,980	-
20	1510	26	25.11	525		7.0	4.9	60	4.0	7.6	21,500	14
21	-	-	-	-		-	-	-	-	-	-	-
22	0155	24	25.18	510		7.0	4.5	53	3.6	6.0	16,500	-
						Station 45						
August												
14	1120	22	31.50	65		6.9	6.7	76	0.9	1.8	632	-
15	1430	22	31.31	700	(1)	6.9	6.8	77	1.4	2.8	10,600	-
16	1425	23	31.28	900	(1)	7.0	7.0	81	1.0	1.3	6,320	-
17	1615	24	31.43	170		6.8	7.2	84	1.0	1.4	1,280	-
18	0845	23	31.42	180		7.0	6.7	77	0.6	1.2	1,160	-
19	0550	23	31.21	1200	(1)	7.2	6.7	77	1.1	2.1	13,600	-
20	1630	25	31.26	1000	(1)	6.9	6.6	79	0.9	1.7	9,180	-
21	-	-	-	-		-	-	-	-	-	-	-
22	-	-	-	-		-	-	-	-	-	-	-

(1) Stage above rating: this is an estimate.

1969

HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

CHEMICAL DATA

DATE	TIME	TEMP °C	GAGE HEIGHT	FLOW cfs	pH	DO mg/l	DO % Sat.	BOD_2 mg/l	BOD_5 mg/l	BOD_5 #/day	TOC mg/l
					Station 47						
August											
14	1015	24	-	(2) -	7.1	6.8	80	1.8	4.5	-	-
15	1330	25	-	-	7.2	7.2	86	4.9	DEPL.	-	-
16	1330	24	-	-	7.3	6.9	81	2.1	4.6	-	-
17	1525	25	-	-	7.2	6.4	76	1.9	3.8	-	-
18	0750	24	-	-	7.1	6.4	75	1.5	3.2	-	-
19	0510	24	-	-	7.4	6.6	77	1.7	3.9	-	-
20	1540	27	-	-	6.9	6.8	84	2.4	5.0	-	-
21	-	-	-	-	-	-	-	-	-	-	-
22	0215	24	-	-	6.9	7.1	83	1.3	2.7	-	-
					Station 48						
August											
14	1040	24	40.88	240	7.0	5.1	60	2.4	4.2	5450	18
15	1400	25	39.04	710	7.0	5.7	68	2.1	4.9	18,800	-
16	1355	25	39.53	580	7.3	5.5	66	2.0	4.2	13,100	13
17	1545	26	37.43	1120	7.2	5.4	66	1.7	2.9	17,500	-
18	0815	23	40.54	325	6.9	5.1	59	1.5	2.5	4,400	-
19	0525	24	40.31	380	7.3	4.7	55	1.2	2.7	5,520	-
20	1555	26	39.48	600	7.0	5.4	66	2.2	5.4	17,500	-
21	-	-	-	-	-	-	-	-	-	-	-
22	0230	25	40.02	455	8.5	5.1	61	1.0	2.4	5,890	-

(2) Not rated.

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HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

CHEMICAL DATA

DATE	TIME	TEMP °C	GAGE HEIGHT	FLOW cfs	pH	DO mg/l	DO % Sat.	BOD_2 mg/l	BOD_5 mg/l	BOD_5 #/day	TOC mg/l
					Station L 1						
August 15	1100	27	-	-	7.5	8.2	101	-	8.4	-	-
September 14	-	22	-	-	-	6.2	70	-	-	-	-
					Station L 3						
August 15	1130	25	-	-	7.2	3.2	38	-	6.2	-	-
September 14	-	21	-	-	-	4.2	47	-	-	-	-
					Station L 4						
August 15	1200	25	-	-	7.2	3.4	41	-	7.4	-	-
September 14	-	21	-	-	-	5.5	61	-	-	-	-

TABLE 2

1969

HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

LONG TERM BOD
(mg/l)

DAY	STATION									
	10	11	14	15	16	17	27	28	29	35
1	3.8	3.0	10	20	9.5	6.3	1.2	1.4	1.8	1.6
2	11	6.5	28	47	20	23	2.2	2.2	3.8	3.0
3	16	10	40	65	34	32	2.8	3.6	5.0	5.2
4	20	11	50	74	42	38	3.8	4.6	5.8	5.4
5	22	13	57	80	46	44	4.2	6.2	6.6	5.6
7	28	18	76	95	58	53	5.6	6.6	8.2	8.0
9	35	22	82	101	65	59	6.2	8.2	10.2	8.6
10	36	22	89	107	69	62	8.0	8.8	10.2	9.4

TABLE 3

1969

HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

BACTERIOLOGICAL

DATE	TEMPERATURE (°C)	TOTAL COLIFORM (MF)	FECAL COLIFORM (MF)
		Station 6	
August			
15	23	6,100	190
19	24	16,000	670
		Station 8	
August			
18	23	8,600	380
19	26	12,000	500
		Station 9	
August			
18	25	- 100	- 10
19	26	27,000	1,100
		Station 11	
August			
15	26	5,400,000	550,000
16	26	58,000,000	780,000
17	26	200,000	24,000
20	27	530,000	3,500
21	27	2,200,000	13,000
		Station 12	
August			
18	24	360,000	18,000
19	25	46,000	19,000
		Station 17	
August			
15	25	490,000	36,000
16	25	6,700,000	120,000
20	25	7,900,000	1,600
21	25	3,100,000	70,000

NOTE: Minus sign indicates less than.

1969

HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

BACTERIOLOGICAL

DATE	TEMPERATURE (°C)	TOTAL COLIFORM (MF)	FECAL COLIFORM (MF)
		Station 18	
August			
17	26	1,100,000	22,000
		Station 20	
August			
15	23	6,600	470
16	23	9,000	910
17	25	31,000	220
20	25	4,600	280
		Station 25	
August			
15	24	5,400	150
16	24	1,500	50
17	25	19,000	110
22	23	34,000	220
		Station 27	
August			
15	24	950,000	280,000
16	25	3,100,000	1,200,000
17	25	120,000	34,000
20	26	5,800,000	2,400,000
		Station 29	
August			
15	25	2,700,000	710,000
16	25	37,000,000	5,800,000
17	25	940,000	270,000
		Station 31	
August			
15	24	5,000,000	500,000
16	24	2,100,000	410,000
18	22	110,000	11,000
20	25	14,000,000	2,300,000

NOTE: Minus sign indicates less than.

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HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

BACTERIOLOGICAL

DATE	TEMPERATURE (°C)	TOTAL COLIFORM (MF)	FECAL COLIFORM (MF)
		Station 34	
August			
15	23	36,000	11,000
16	23	140,000	33,000
		Station 35	
August			
15	25	1,500,000	800,000
16	25	9,800,000	2,400,000
18	24	120,000	17,000
22	24	1,100,000	180,000
		Station 45	
August			
16	23	51,000	5,500
18	23	16,000	1,200
		Station 48	
August			
19	24	4,100,000	750,000
22	25	60,000	2,000

TABLE 4

1969 HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

HEAVY METALS

DATE	Cr (mg/l)	Cu (mg/l)	Pb (mg/l)	Zn (mg/l)
		Station 6		
August 14	-0.01	0.02	-0.1	-0.01
18	0.01	0.02	-0.1	-0.01
		Station 8		
August 14	-0.01	-0.01	-0.1	-0.01
18	0.02	0.05	-0.1	0.02
		Station 9		
August 14	0.02	0.02	-0.1	0.01
18	0.05	0.02	-0.1	0.03
		Station 11		
August 14	0.09	0.06	-0.1	0.17
16	0.16	0.06	-0.1	0.24
18	0.05	0.03	-0.1	0.11
20	0.12	0.06	-0.1	0.21
		Station 12		
August 14	-0.01	0.02	-0.1	-0.01
18	-0.01	0.02	-0.1	-0.01
		Station 13		
August 14	-0.01	0.02	-0.1	0.03
16	0.04	0.03	-0.1	0.09
18	-0.01	0.02	-0.1	0.02
20	0.01	0.02	-0.1	0.15

NOTE: Minus sign indicates less than.

TABLE 4

1969 HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

HEAVY METALS

DATE	Cr (mg/l)	Cu (mg/l)	Pb (mg/l)	Zn (mg/l)
		Station 17		
August				
14	0.03	0.04	-0.1	0.08
16	0.02	0.05	-0.1	0.13
18	0.03	0.04	-0.1	0.17
20	0.01	0.03	-0.1	0.04
		Station 20		
August				
14	0.03	0.02	-0.1	0.05
16	0.02	0.01	-0.1	0.04
18	0.05	0.04	-0.1	0.07
20	0.02	-0.01	-0.1	0.02
		Station 25		
August				
14	0.02	0.02	-0.1	0.03
16	0.03	0.02	-0.1	0.02
18	0.03	0.02	-0.1	0.03
20	0.03	0.01	-0.1	0.01
		Station 27		
August				
14	0.04	0.02	-0.1	0.08
16	0.02	0.02	-0.1	0.05
18	0.02	0.01	-0.1	0.03
20	0.02	0.02	-0.1	0.04
		Station 29		
August				
14	0.55	0.02	-0.1	0.12
16	0.20	0.02	-0.1	0.09
18	0.20	0.02	-0.1	0.05
20	0.15	0.02	-0.1	0.04

NOTE: Minus sign indicates less than.

TABLE 4

1969 HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

HEAVY METALS

DATE	Cr (mg/l)	Cu (mg/l)	Pb (mg/l)	Zn (mg/l)
		Station 35		
August				
14	0.50	0.03	-0.1	0.08
16	0.10	0.04	-0.1	0.05
18	0.09	0.02	-0.1	0.04
20	0.14	0.02	-0.1	0.03
		Station 47		
August				
14	0.06	0.01	-0.1	0.10
16	0.12	0.01	-0.1	0.02
18	0.03	0.01	-0.1	0.01
20	0.03	-0.01	-0.1	-0.01
		Station 48		
August				
14	0.03	0.01	-0.1	0.01
16	0.10	0.02	-0.1	0.03

NOTE: Minus sign indicates less than.

TABLE 5

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HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

NUTRIENTS

DATE	DEPTH (Ft)	ORG-N (mg/l)	NH_3-N (mg/l)	NO_3-N (mg/l)	Total Phosphorus (mg/l)
			Station 6		
August					
14	1	0.7	0.15	0.6	0.57
18	1	0.8	0.09	0.6	0.30
			Station 8		
August					
14	1	0.5	0.11	-0.1	0.05
18	1	0.8	0.20	0.3	0.21
			Station 9		
August					
14	1	0.3	0.09	0.2	0.19
18	1	0.2	0.09	0.1	0.12
			Station 11		
August					
14	1	2.6	6.2	0.4	4.0
16	1	5.4	7.0	0.2	5.8
18	1	2.8	9.8	1.2	6.4
20	1	6.6	8.6	0.2	5.8
			Station 12		
August					
14	1	1.6	0.91	0.2	0.58
18	1	1.6	0.71	0.1	0.31
			Station 13		
August					
14	1	2.2	2.2	0.3	1.2
16	1	3.8	4.2	0.3	3.2
18	1	1.2	0.91	0.9	-
20	1	4.0	6.2	2.6	2.8

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HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

NUTRIENTS

DATE	DEPTH (Ft)	ORG-N (mg/l)	NH_3-N (mg/l)	NO_3-N (mg/l)	Total Phosphorus (mg/l)
			Station 17		
August					
14	1	3.8	9.0	-0.1	5.8
16	1	4.0	15.0	-0.1	6.0
18	1	5.8	16.0	-0.1	6.0
20	1	0.6	6.4	-0.1	4.2
			Station 20		
August					
14	1	3.4	7.6	0.2	4.6
16	1	2.6	8.0	0.2	3.8
18	1	2.5	4.7	0.3	2.8
20	1	1.5	3.7	0.1	2.4
			Station 25		
August					
14	1	1.7	1.6	2.2	2.8
16	1	1.9	2.7	2.5	2.6
18	1	2.3	2.2	2.3	2.2
20	1	1.1	0.31	1.0	0.52
			Station 28		
August					
14	1	5.8	0.72	1.9	2.0
16	1	5.6	2.3	2.3	2.7
18	1	2.4	0.67	2.6	2.2
20	1	2.8	0.31	0.6	0.66
			Station 35		
August					
14	1	2.7	0.75	1.4	2.4
16	1	1.9	1.8	1.0	1.7
18	1	2.1	0.65	2.4	2.0
20	1	1.4	0.36	0.9	0.63
			Station 48		
August					
14	1	1.2	0.21	1.0	0.62
16	1	1.5	0.25	1.1	1.2

1969

HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

NUTRIENTS

DATE	DEPTH (Ft)	ORG-N (mg/l)	NH_3-N (mg/l)	NO_3-N (mg/l)	Total Phosphorus (mg/l)
			Station L 1		
August 14	1	1.8	0.48	0.8	0.85
	7	1.2	-0.01	1.5	1.0
			Station L 3		
August 14	1	1.7	0.59	0.9	1.6
			Station L 4		
August 14	1	1.6	0.37	0.5	1.5

TABLE 6

1969

HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

PESTICIDES

STATION	ORGANIC CHLORINE (mg/l)	DDD** (mg/l)	DDE (mg/l)	DDT (mg/l)
6	33.5*			
20	28.1			
27	14.4			
35	21.2			
48	69.0	ND***	Trace	ND

* Composite samples

** Only samples containing more than 50 mg/l of organic chlorine were further examined.

*** Not detectable: below sensitivity of procedure, approximately 10 parts/trillion.

TABLE 7

1969

HAW RIVER SURVEY

METHYLENE BLUE ACTIVE SUBSTANCES

DATE	MBAS (mg/l)
Station 29	
August	
20	0.3
22	0.2
Station 35	
August	
20	0.3
22	0.2
Station 47	
August	
20	0.1
22	0.1
Station 48	
August	
20	0.2

SURVEY RESULTS OF BENTHIC ORGANISMS - UPPER HAW RIVER BASIN

(Incl. Buffalo Creek and Reedy Fork Creek)

Station	6	12	13	14	15	16	17	9	10	11	18	8	19	20
Pollution-Sensitive Organisms														
Mayflies														
Ameletus sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Baetis sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ephemerella sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Heptagenia sp.	--	--	--	--	--	--	--	--	--	--	--	X	--	--
Stenonema sp.	--	--	--	--	--	--	--	--	--	--	--	1	--	--
Caddisflies														
Cheumatopsyche sp.	X	--	--	--	--	--	--	--	--	--	--	X	--	--
Hydropsyche sp.	X	--	--	--	--	--	--	--	--	--	--	1	--	--
Hellgrammite														
Corydalus sp.	--	--	--	--	--	--	--	--	--	--	--	X	--	--
Gill Breathing Snails														
Campeloma sp.	--	--	--	--	--	--	--	--	--	--	--	12	--	--
Pleurocerca sp.	--	--	--	--	--	--	--	--	--	--	--	8	--	--
Intermediate Organisms														
Crayfish														
Cambarus sp.	1	--	--	--	--	--	--	--	--	--	--	X	--	--
Scuds														
Cammarus sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hyalella sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sow-bugs														
Asellus sp.	--	--	--	--	--	--	--	--	X	--	--	--	--	--
Fingernail Clams														
Sphaerium sp.	--	--	--	--	--	--	--	--	--	--	--	19	--	--
Damselflies														
Argia sp.	1	--	--	--	--	--	--	--	--	--	--	--	--	X
Ischnura sp.	--	--	--	--	--	--	--	--	--	--	--	X	--	--
Dragonflies														
Epicordulia sp.	--	--	--	--	--	--	--	--	X	--	--	--	--	--
Libellula sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	X
Nasiaeschna sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Midges														
Cryptochironomus sp.	--	--	--	--	--	--	--	--	--	--	--	1	--	--
Metriocnemus sp.	--	--	--	--	--	--	--	--	X	--	--	--	--	--
Pentaneura sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Polypedilum sp.	X	X	--	--	--	--	--	--	--	--	--	--	--	26
Procladius sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diamesinae	--	--	--	--	--	--	--	--	X	--	--	--	--	--

Station	6	12	13	14	15	16	17	9	10	11	18	8	19	20
Intermediate Organisms (Continued)														
Blackflies														
Simulium sp.	X	--	--	--	--	--	--	--	--	--	--	--	--	--
Craneflies (Tibulidae)														
Tipula sp.	--	--	X	--	--	--	--	--	--	--	--	--	--	--
Phantom Midges (Culicidae)														
Chaoborus sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Horseflies (Tabanidae)														
Tabanus sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Coleoptera														
Berosus sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Air Breathing Snail														
Ferrissia sp.	--	--	--	--	--	--	--	--	--	--	--	X	--	4
Helicosma sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lymnaea sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pollution Tolerant Organisms														
Sewage Fly Larvae														
Psychoda sp.	--	--	--	--	--	--	--	--	--	2	--	--	--	--
Bloodworms (Chironomidae)		--	--	--	--	--	--	--	--	--	--	--	--	--
Chironomus sp.	--	X	--	--	--	--	--	--	X	2	2	--	2	--
Airbreathing Snail														
Physa sp.	--	X	--	--	--	--	--	--	X	--	--	--	X	X
Leeches														
Erpobdella sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Glossiphonia sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sludgeworms (Tubificidae)														
Limnodrilus sp.	--	--	X	--	--	--	--	--	--	--	--	--	--	--
Tubifex sp.	--	X	X	--	--	27	213	--	12	50	150	6	326	39
Bristleworm														
Lumbriculidae	--	--	--	--	--	--	--	X	2	--	--	--	--	--
Number of Genera (Kinds)	6	4	3	0	0	1	1	1	8	3	2	13	3	6
No. of bottom organisms in square foot sample	2	--	--	0	0	27	213	--	14	54	152	48	328	69

X - Present but not collected in quantitative sample

SURVEY RESULTS OF BENTHIC ORGANISMS - LOWER HAW RIVER BASIN

(Incl. Town Creek, Back Creek, Alamance Creek, Little Alamance Creek)

STATION	21	24	25	27	28	29	31A	31	34A	34	35	45A	45	47	48
Pollution Sensitive Organisms															
Mayflies															
Ameletus sp.	--	--	--	--	--	--	3	--	--	--	--	--	--	1	--
Baetis sp.	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--
Ephemerella sp.	--	--	--	--	--	--	--	--	--	--	--	--	X	--	--
Heptagenia sp.	--	--	--	--	--	--	--	--	X	--	--	--	--	X	--
Stenonema sp.	X	X	X	--	--	--	--	--	X	--	--	--	X	1	--
Caddisflies															
Cheumatopsyche sp.	X	X	--	--	--	--	--	--	X	--	--	--	--	X	--
Hydropsyche sp.	13	X	3	--	--	--	200	--	X	--	X	--	--	2	--
Hellgrammite															
Corydalus sp.	1	--	--	--	--	--	--	--	--	--	--	--	--	X	--
Gill breathing Snails															
Campeloma sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pleurocerca sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Intermediate Organisms															
Crayfish															
Cambarus sp.	--	--	--	--	--	--	3	--	--	--	--	--	--	--	--
Scuds															
Gammarus sp.	X	--	--	--	--	--	--	--	--	--	X	--	--	X	--
Hyalella sp.	X	X	229	--	--	X	--	--	--	--	--	--	--	--	--
Sow-bugs															
Asellus sp.	X	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fingernail Clams															
Sphaerium sp.	--	--	--	--	--	--	--	--	X	--	--	--	--	--	--
Damselflies															
Argia sp.	X	X	X	--	--	--	--	--	--	--	--	--	--	X	--
Ischnura sp.	--	X	X	1	--	--	--	--	--	--	--	--	X	--	--
Dragonflies															
Epicordulia sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nasiaeschna sp.	--	--	--	--	--	--	--	--	X	--	--	--	--	--	--
Midges (Chironomidae)															
Cryptochironomus sp.	--	--	X	--	--	--	--	--	--	--	--	--	--	--	--
Metriocnemus sp.	--	--	--	--	--	--	--	--	X	--	1	--	--	--	--
Pentaneura sp.	X	--	X	--	--	X	--	--	--	--	--	--	--	--	--
Polypedilum sp.	X	X	--	11	--	2	--	--	--	--	--	--	--	--	--
Procladius sp.	2	--	--	--	--	--	1	--	--	--	--	--	--	--	--
Diamesinae	X	--	1	18	--	10	--	--	--	--	X	--	--	X	--
Blackflies															
Simulium sp.	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--

STATION	21	24	25	27	28	29	31A	31	34A	34	35	45A	45	47	48
Intermediate Organisms (Continued)															
Craneflies (Tibulidae)															
Tipula sp.	X	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phantom Midges															
Chaoborus sp.	--	--	--	--	--	--	--	--	--	--	--	--	X	--	--
Horseflies (Tabanidae)															
Tabanus sp.	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Coleoptera															
Berosus sp.	--	--	1	--	--	--	--	--	--	--	X	--	--	--	--
Air Breathing Snail															
Ferrissia sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	X	--
Helisoma sp.	--	--	X	--	--	X	X	--	--	--	2	--	--	4	--
Lymnaea sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	X	--
Pollution Tolerant Organisms															
Sewage Fly Larvae															
Psychoda sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bloodworms															
Chironomus sp.	X	2	X	X	2	X	--	--	X	--	--	--	--	--	--
Air breathing Snail															
Physa sp.	X	X	1	2	--	X	--	--	--	--	1	--	--	2	--
Leeches															
Erpobdella sp.	2	2	6	3	6	7	1	--	--	--	10	--	--	8	--
Glossiphonia sp.	--	--	--	--	--	--	--	--	--	--	--	X	--	X	--
Sludgeworms															
Limnodrilus sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tubifex sp.	X	43	1	67	845	3	4	X	--	X	60	66	X	--	--
Bristleworm															
Lumbriculidae	--	--	--	--	--	--	--	--	--	--	--	X	--	--	--
Number of Genera (Kinds)	18	11	15	8	3	9	7	1	8	1	9	3	5	15	--
X- Present but not collected in quantitative sample															
No. of Bottom organisms in square foot sample	19	47	244	103	853	22	212	--	--	--	74	66	--	18	--

TABLE 9

1969

HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

SWEPSONVILLE IMPOUNDMENT

CHEMICAL - PHYSICAL DATA

DATE	WATER DEPTH	SAMPLE DEPTH	TEMPERATURE (c°)	D.O. (mg/l)	D.O. (% Saturation)
			Station A-1		
August 17	-	1	24	5.65	66
		5	24	5.90	69
			Station V 1		
August 17	4	1	25	5.20	62
			Station V 2		
August 17	4	1	25	5.0	60
			Station V 3		
August 17	4	1	25	4.0	48
			Station V 4		
August 17	9	1	25	5.0	60
		5	25	4.8	57
			Station V 5		
August 17	10	1	25	4.9	58
		5	25	4.7	56
		10	25	4.4	53

TABLE 10

1969

HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

SAXAPAHAW IMPOUNDMENT

DISSOLVED OXYGEN PROFILE DATA

August 14, 1969

TIME	DEPTH (ft)	TEMPERATURE (°C)	DO (probe mg/l)	DO (Winkler mg/l)	pH
			Station L 1		
1640	1	29	18.8	11.0	7.65
	1.5	29	-	-	-
	2	27	15.3	-	-
	3	25	3.5	5.8	6.7
	4	25	3.2	-	-
	5	25	3.3	-	-
	6	25	2.4	-	-
	7	25	2.3	2.6	6.5
			Station L 2		
1550	1	28	15.5	-	-
	1.5	27	14.9	-	-
	2	27	15.3	9.4	7.7
	2.5	26	7.3	-	-
	3	26	4.0	-	-
	5	25	2.3	-	-
	7.5	25	2.5	2.4	6.7
	10	25	2.3	-	-
	12.5	25	1.8	2.5	-
	15	24	0.4	-	-
	17	23	0.0	-	-
			Station L 3		
1530	1	29	7.2	-	-
	2	25	5.7	7.3	-
	3	25	4.0	-	-
	6	25	3.4	-	-
	9	24	2.9	-	-
			Station L 4		
1500	1	28	4.7	-	-
	2	26	4.1	-	-
	5	25	3.5	3.8	-
	6	25	3.1	-	-
	7	25	2.6	-	-

TABLE 11

1969

HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

DIURNAL DATA AT STATION L 1

SAXAPAHAW IMPOUNDMENT

DATE	DEPTH (ft)	TIME	DO (mg/l)	pH	ALKALINITY (mg/l)	TEMP (°C)
8/15/69	1	1800	9.3	8.45	50	27
	3.5	1800	2.8	8.45	95	25
	7	1800	1.4	7.5	70	25
	1	2400	2.7	7.0	80	25
	3.5	2400	2.4	7.0	90	25
	7	2400	1.8	6.9	85	25
8/16/69	1	0600	2.75	6.9	80	23
	3.5	0600	2.50	6.9	75	23
	7	0600	2.90	6.8	70	23
	1	1200	3.40	6.7	75	24.5
	3.5	1200	3.40	6.7	75	24.5
	7	1200	3.15	6.8	75	24.5
	1	1730	3.95	-	-	26
	3.5	1730	3.15	-	-	25
	7	1730	2.85	-	-	25

TABLE 12

1969

HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

PRIMARY PRODUCTION DATA

DATE	DEPTH (ft)	SAMPLING TIME (hours)	TEMP (°C)	INITIAL DO (mg/l)	DO-Light Bottle (mg/l)	DO-Dark Bottle (mg/l)	pH	SECCHI DISC (inches)
				Station L 1				
8/15	1	4 ½	27	8.2	7.5 8.7	5.8 7.0	7.5	-
	5	4 ½	25	6.0	4.0 4.5	2.5 2.8	-	-
8/16	1	5	25	3.4	3.1 2.9	3.0 3.0	-	-
	5	5	25	3.0	2.1 2.6	2.5 2.8	-	-
8/17	1	7	25	4.2	3.5 4.3	3.6 3.5	-	-
	5	7	24	2.9	2.2 2.7	2.6 2.8	-	-
9/13	1	5 ¼	19	4.5	5.5 5.5	4.2 4.0	-	11
	5	5 ¼	19	4.3	3.8 3.9	4.0 4.2	-	-
				Station L 3				
8/15	1	4 ½	25	3.2	3.0 3.1	2.8 2.8	7.2	-
	5	-	-	-	-	-	-	-
8/16	1	5	25	5.35	5.2 5.0	4.9 5.3	-	-
	5	5	25	5.35	5.3 -	5.1 -	-	-
8/17	1	6	25	4.2	4.3 4.3	4.0 3.9	-	-
	5	6	25	4.0	3.8 3.9	3.9 3.9	-	-

1969

HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

PRIMARY PRODUCTION DATA

DATE	DEPTH (ft)	SAMPLING TIME (hours)	TEMP (°C)	INITIAL DO (mg/l)	DO-Light Bottle (mg/l)	DO-Dark Bottle (mg/l)	pH	SECCHI DISC (inches)
				Station L 3				
9/13	1	5	19	5.3	6.0 6.2	5.1 5.1	-	14
	5	5	19	5.2	4.1 4.9	4.5 4.6	-	-
				Station L 4				
8/15	1	4 ½	25	3.4	2.9 2.8	2.8 2.8	7.2	-
	5	4 ½	24	3.8	2.7 3.1	2.4 2.9	-	-
8/16	1	4 3/4	24	5.8	5.0 5.3	5.1 5.2	-	-
	5	4 3/4	24	5.7	5.2 5.6	5.0 5.2	-	-
8/17	1	5	25	5.5	5.7 5.4	5.2 5.3	-	-
	5	5	25	5.5	5.3 5.3	5.3 5.3	-	-
9/13	1	5	19	5.2	5.9 5.4	4.7 4.7	-	20
	5	5	19	4.9	4.4 4.4	4.5 4.4	-	-

PHYTOPLANKTON DATA - HAW RIVER IMPOUNDMENT AT SAXAPAHAW, N. C.

ALGAE	AUGUST 16, 1969 STATION L-4 C/mL	STATION L-3 C/mL	STATION L-1 C/mL	AUGUST 17, 1969 STATION L-4	STATION L-3	STATION L-1	SEPTEMBER 13, 1969 STATION L-4	STATION L-3	STATION L-1
Coccoid blue-green									
Anacystis cyanea	3,203	2,774	8,122	3,689	1,802	5,091	2,288	3,032	4,004
Anacystis dimidiata	86								
Total	3,289	2,774	8,122	3,689	1,802	5,091	2,288	3,032	4,004
Filamentous blue-green									
Anabena sp.	57	29	143		29	29	29	114	86
Total	57	29	143		29	29	29	114	86
Coccoid-green									
Actinastrum sp.			29						
Ankistrodesmus sp.	57	172	229	143	229	315	114	86	143
Chlorella sp.	5,291	1,430	515	3,575	915	5,291	601	257	1,115
Coelastrum sp.	29				29	86			
Eudorina sp.		172			86				
Gonium sp.					200				
Oocystis sp.			29						29
Scenedesmus sp.	86						29	29	
Tetraedron sp.							29	29	
Total	5,463	1,774	802	3,718	1,459	5,692	802	401	1,316
Chlamydomonas sp.	1,144	715	2,803	4,290	572	1,459	286	629	1,516
Euglena sp.		114	114			29	29		114
Phacus sp.	86	229	172		114	57	86	86	57
Total	1,230	1,058	3,089	4,290	686	1,545	401	715	1,687
Other pigmented Flagellates									
Trachelmonas sp.	686	57	143		29		29	29	29
Total	686	57	143		29		29	29	29
Live centric diatoms		143	29	114	57	172	515	229	57
Live pennate diatoms							57		
Total Live algae	10,725	5,835	12,328	11,811	4,062	12,529	4,121	4,520	7,179

TABLE 13

1969

HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

BENTHIC INVESTIGATION IN SAXAPAHAW IMPOUNDMENT

DATE	BENTHIC ORGANISMS (number/square ft)	OXYGEN DEMAND (grams/meter^2/day)	VOLATILE SOLIDS(%)	CARBON (%)	NITROGEN (%)	PHOSPHOROUS (%)
			Station L 1			
August 17	-	-	-	2.0	0.16	0.10
September 14	380 sludgeworms	5.23	8.8	-	-	-
			Station L 2			
August 17	-	-	-	-	-	-
September 14	360 sludgeworms	6.93	13.4	-	-	-
			Station L 3			
August 17	-	-	-	2.5	0.22	0.11
September 14	200 sludgeworms	4.62	10.3	-	-	-
			Station L 4			
August 17	-	-	-	2.8	0.24	0.20
September 14	80 sludgeworms	-	1.5	-	-	-

TABLE 14

1969

HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

TIME OF TRAVEL

August - September *

From Station	To Station	Distance (miles)	Time of Travel (hrs.)	Gage Ht. (ft.)	Flow (cfs)
13	14	2.4	14 ½	13.52 @ 13	17
14	16	4.3	28 ½	12.80 @ 17	18.5
16	17	2.8	24	12.75 @ 17	20
17	18	2.7	12	12.78 @ 17	20
18	19	9.1	28 ½	37.40 @ 19	50
19	25	12.1	140	23.14 @ 25	88
25	27	3.5	19 ½ **	1.83 @ 27***	90
27	28	1.6	4 ½	-	-
28	29	1.8	6 ½	-	-
29	35	1.5	7	-	-

* Investigation conducted by U.S.G.S. - Raleigh, N.C.
** Estimated
*** U.S.G.S. gage

TABLE 15

1969

HAW RIVER SURVEY

CAPE FEAR RIVER BASIN

NUTRIENTS, TOC, AND HEAVY METALS
AT WASTE TREATMENT PLANTS

Plant Location	Date	Sample Point	ORG-N mg/l	NH_3-N mg/l	NO_3-N mg/l	TOTAL P mg/l	TOC mg/l	Cr mg/l	Cu mg/l	Pb mg/l	Zn mg/l	Cd mg/l
Greensboro (N.Buffalo Ck)	8-21	Plant Effluent	1.0	16.4	-0.1	9.8	18	0.10	0.04	-0.1	0.05	-
Greensboro (S.Buffalo Ck)	8-21	Plant Effluent	19.4	16.6	0.1	13.4	105	0.05	0.27	0.1	0.77	-
Burlington (Haw River)	8-18	Raw Waste	13.2	12.6	0.4	12.0	87	0.04	0.08	-0.1	0.18	-0.01
	8-18	Primary Clarifier Effluent	6.4	14.2	0.3	8.8	71	0.04	0.08	-0.1	0.40	-0.01
	8-18	Trickling Filter Effluent	8.0	13.4	0.4	9.2	66	0.05	0.10	-0.1	0.40	-0.01
	8-18	Plant Effluent	10.0	11.6	0.4	11.0	70	0.06	0.11	-0.1	0.46	-0.01
	8-21	Raw Waste	13.4	10.6	1.1	17.0	128	0.21	0.07	-0.1	0.29	-

1969

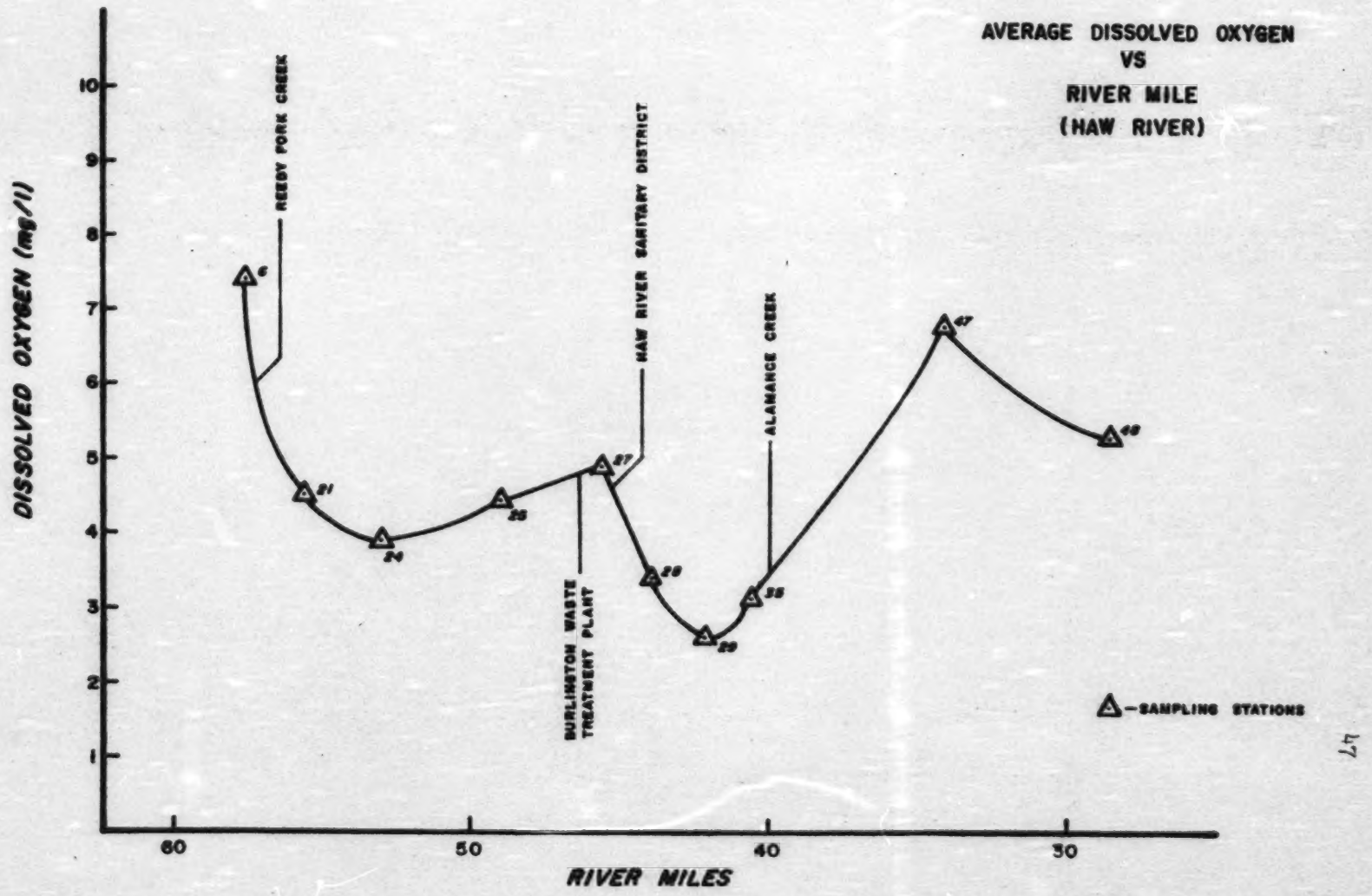
HAW RIVER SURVEY

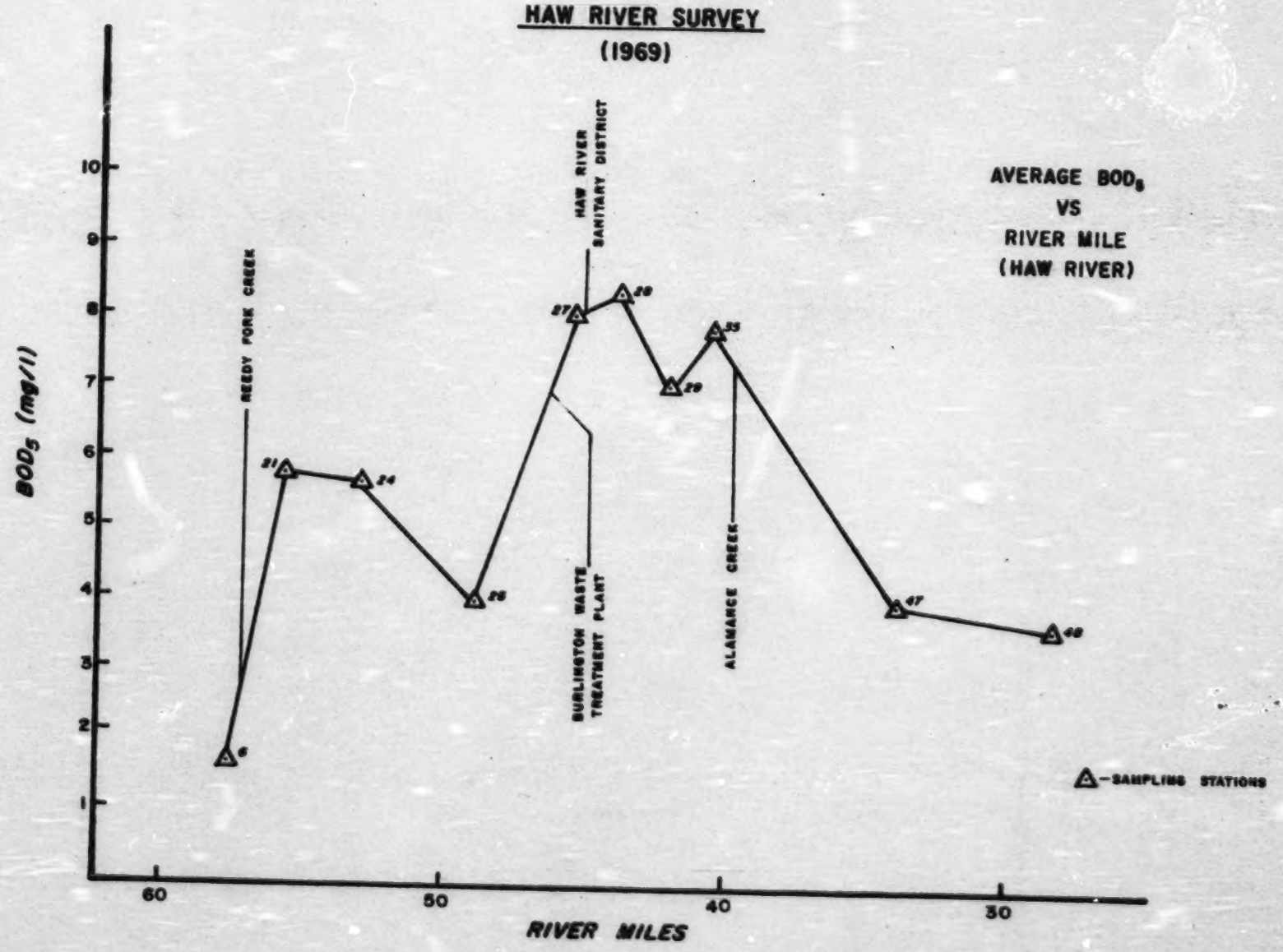
CAPE FEAR RIVER BASIN

NUTRIENTS, TOC, AND HEAVY METALS
AT WASTE TREATMENT PLANTS

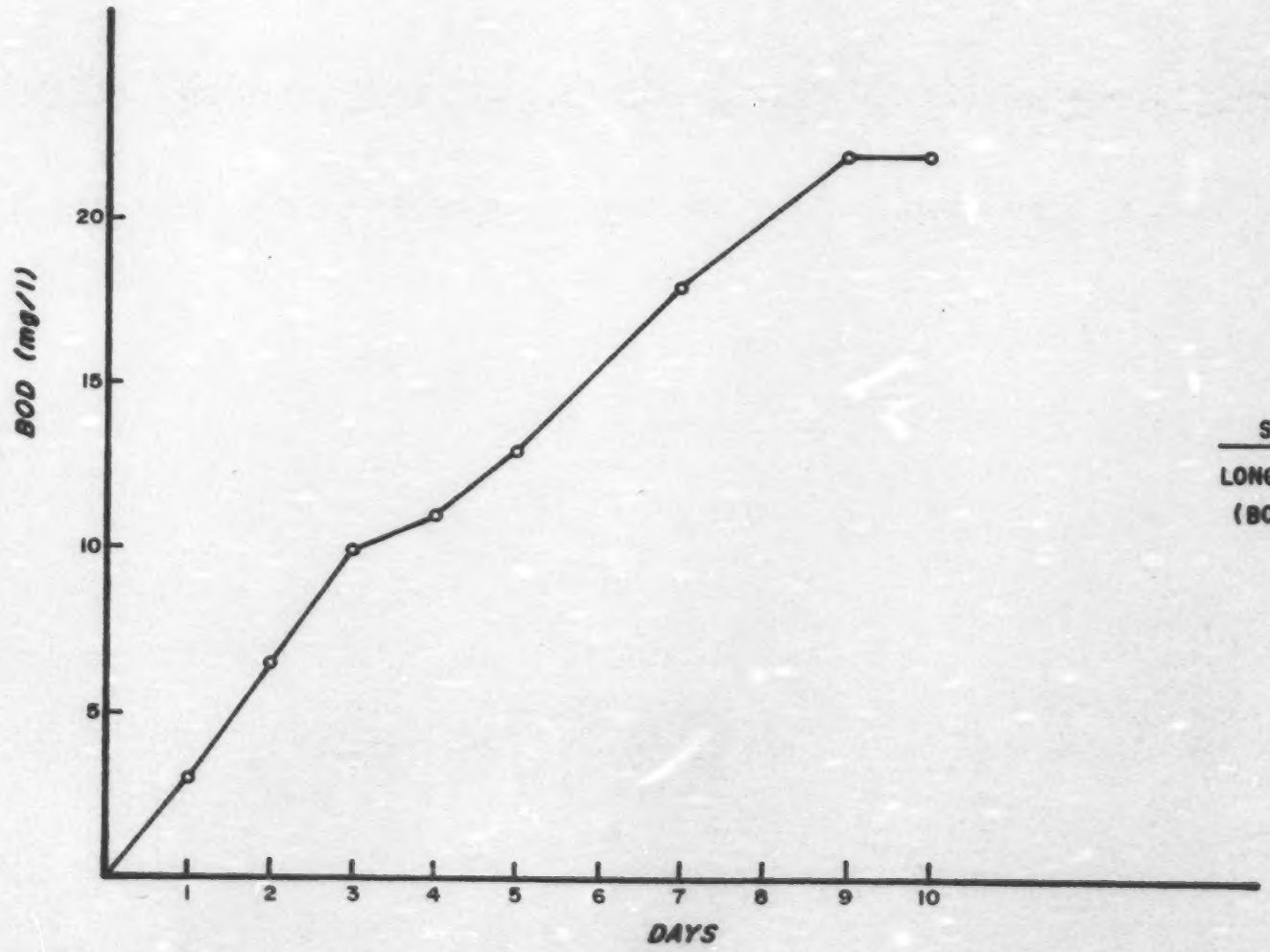
Plant Location	Date	Sample Point	ORG-N mg/l	NH_3-N mg/l	NO_3-N mg/l	TOTAL P mg/l	TOC mg/l	Cr mg/l	Cu mg/l	Pb mg/l	Zn mg/l	Cd mg/l
Burlington (Haw River)	8-21	Primary Clarifier Effluent	12.0	9.8	0.4	15.4	126	0.17	0.10	-0.1	0.44	-
	8-21	Trickling Filter Effluent	12.2	9.2	0.4	15.8	122	0.18	0.07	-0.1	0.40	-
	8-21	Plant Effluent	10.4	12.4	0.5	14.8	105	0.14	0.09	-0.1	0.40	-
Haw River Sanitary District (Haw River)	8-20	Plant Effluent	51.4	23.0	0.3	8.2	410	27.0	0.11	-0.1	.31	-
	8-21	Raw Waste	27.0	5.8	-0.1	6.2	800	25.0	0.03	-0.1	-	-
	8-21	Plant Effluent	35.8	7.8	0.2	4.2	320	23.0	0.10	-0.1	-	-

HAW RIVER SURVEY
(1969)



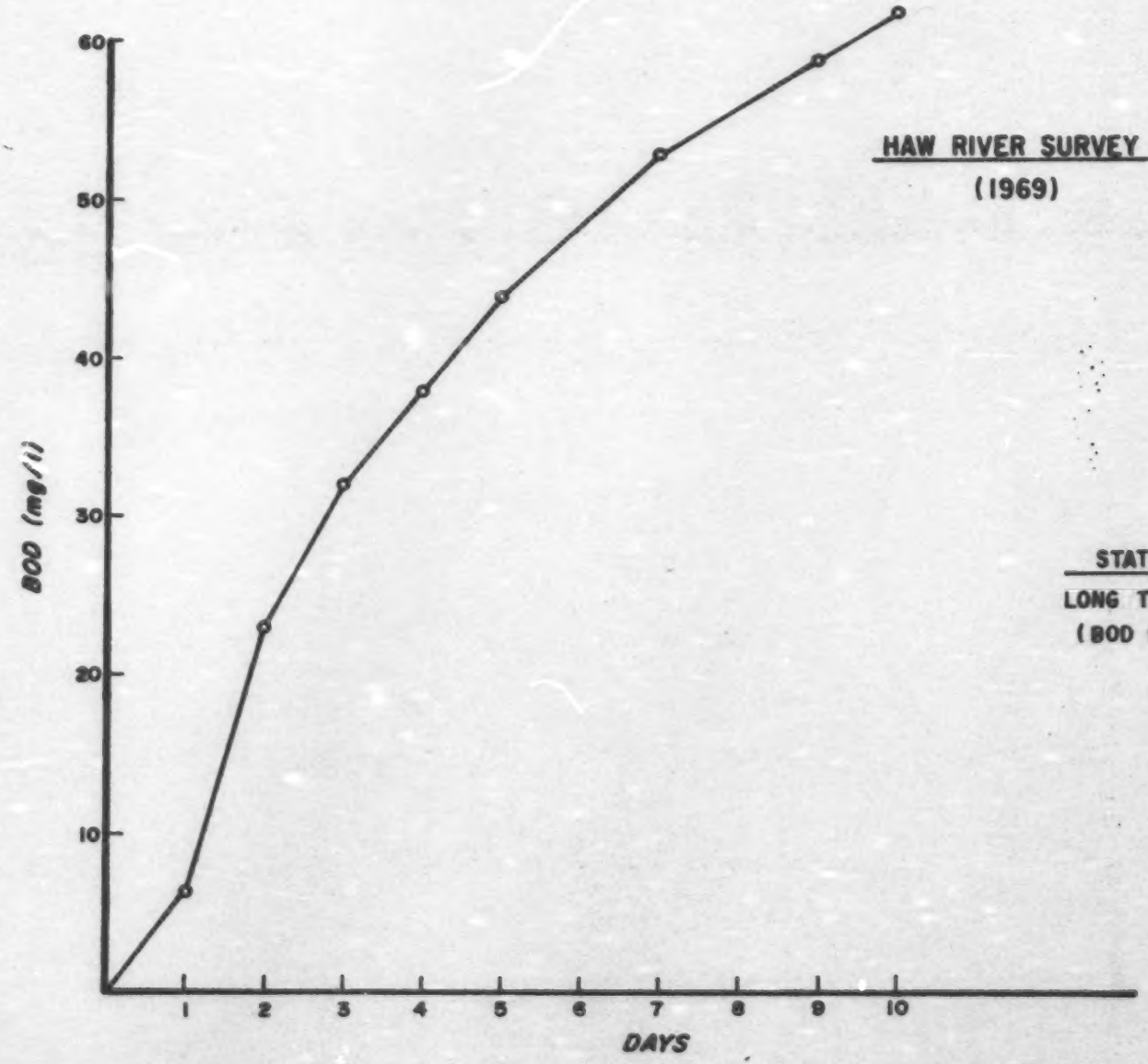

HAW RIVER SURVEY
(1969)
AVERAGE BOD_5
VS
RIVER MILE
(HAW RIVER)
BOD_5 (mg/l)
10
9
8
7
6
5
4
3
2
1
REEDY FORK CREEK
HAW RIVER
SANITARY DISTRICT
BURLINGTON WASTE
TREATMENT PLANT
ALAMANCE CREEK
21
24
26
27
28
29
35
47
48
60
50
40
30
RIVER MILES
△—SAMPLING STATIONS

HAW RIVER SURVEY
(1969)



STATION II

LONG TERM BOD
(BOD vs DAY)

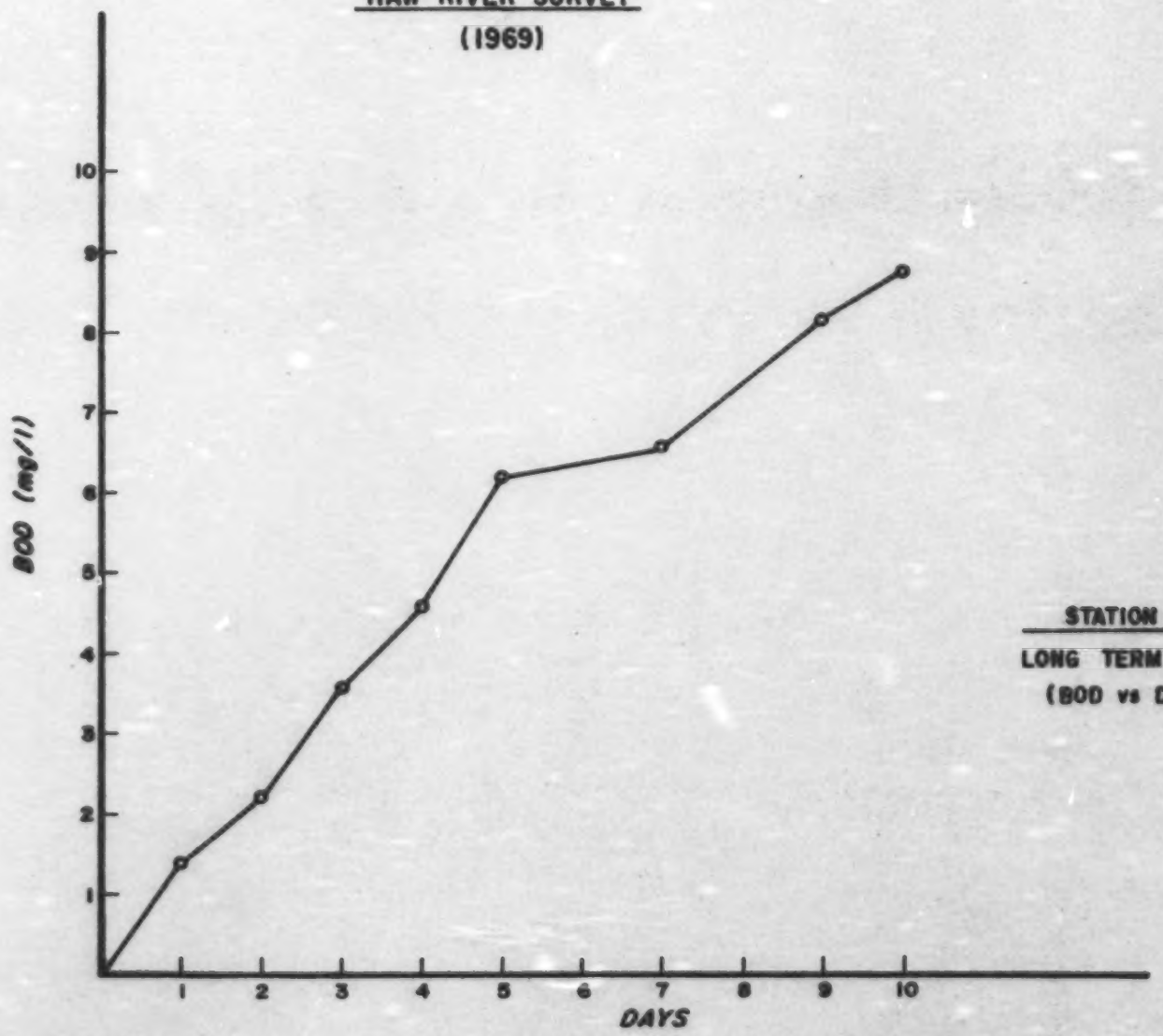


HAW RIVER SURVEY
(1969)

STATION 17
LONG TERM BOD
(BOD vs DAY)

HAW RIVER SURVEY

(1969)



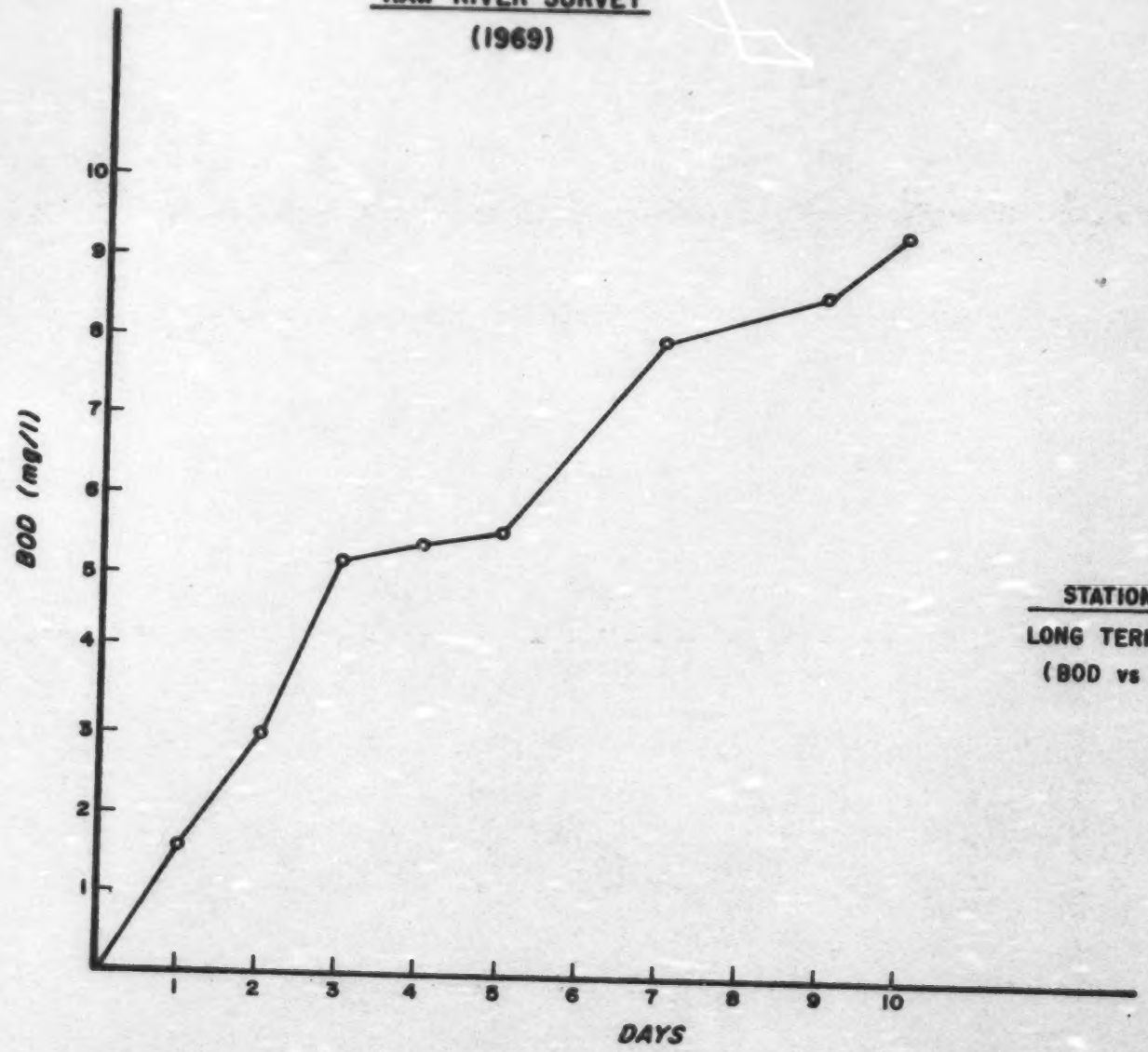
STATION 28

LONG TERM BOD

(BOD vs DAY)

HAW RIVER SURVEY

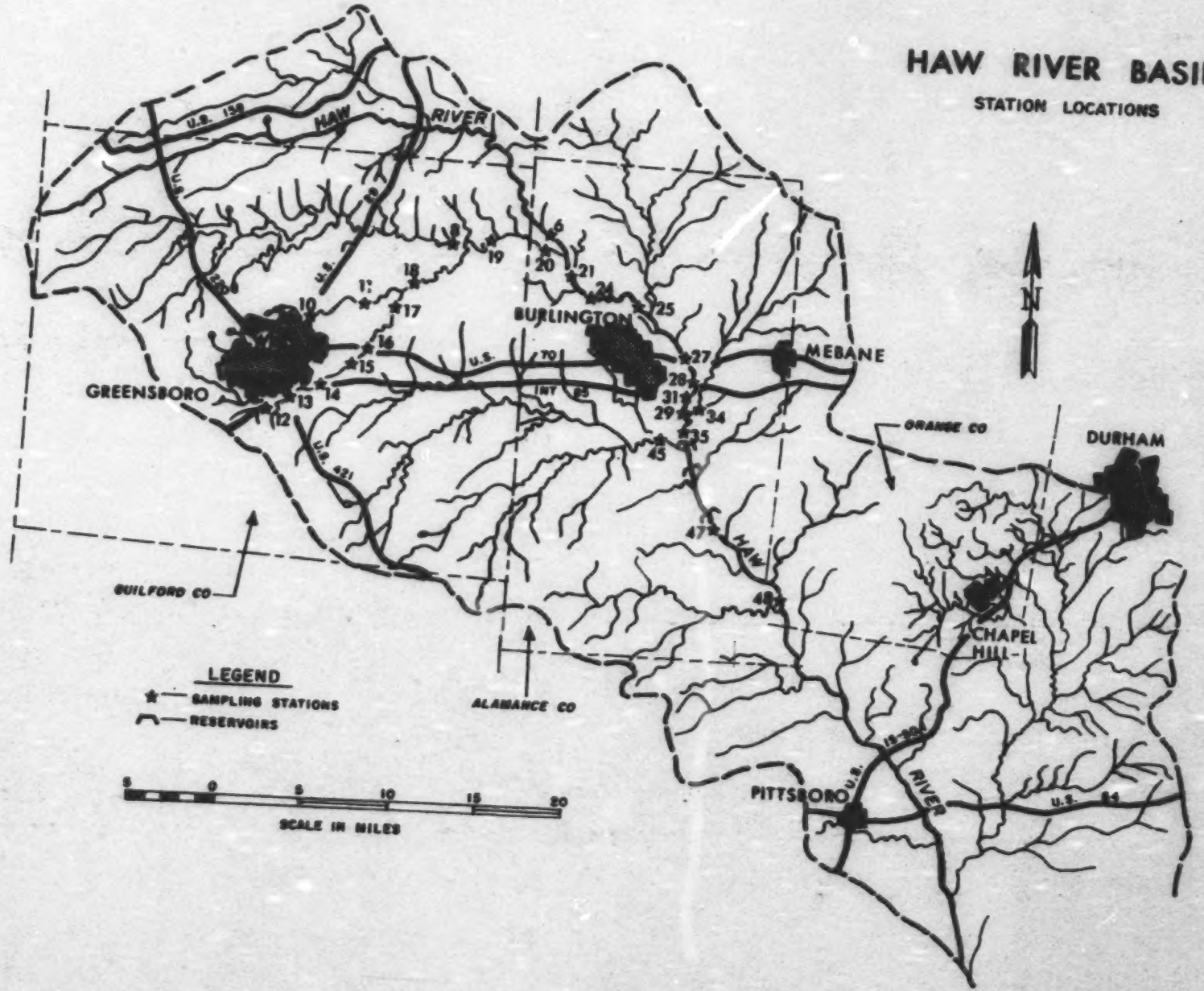
(1969)

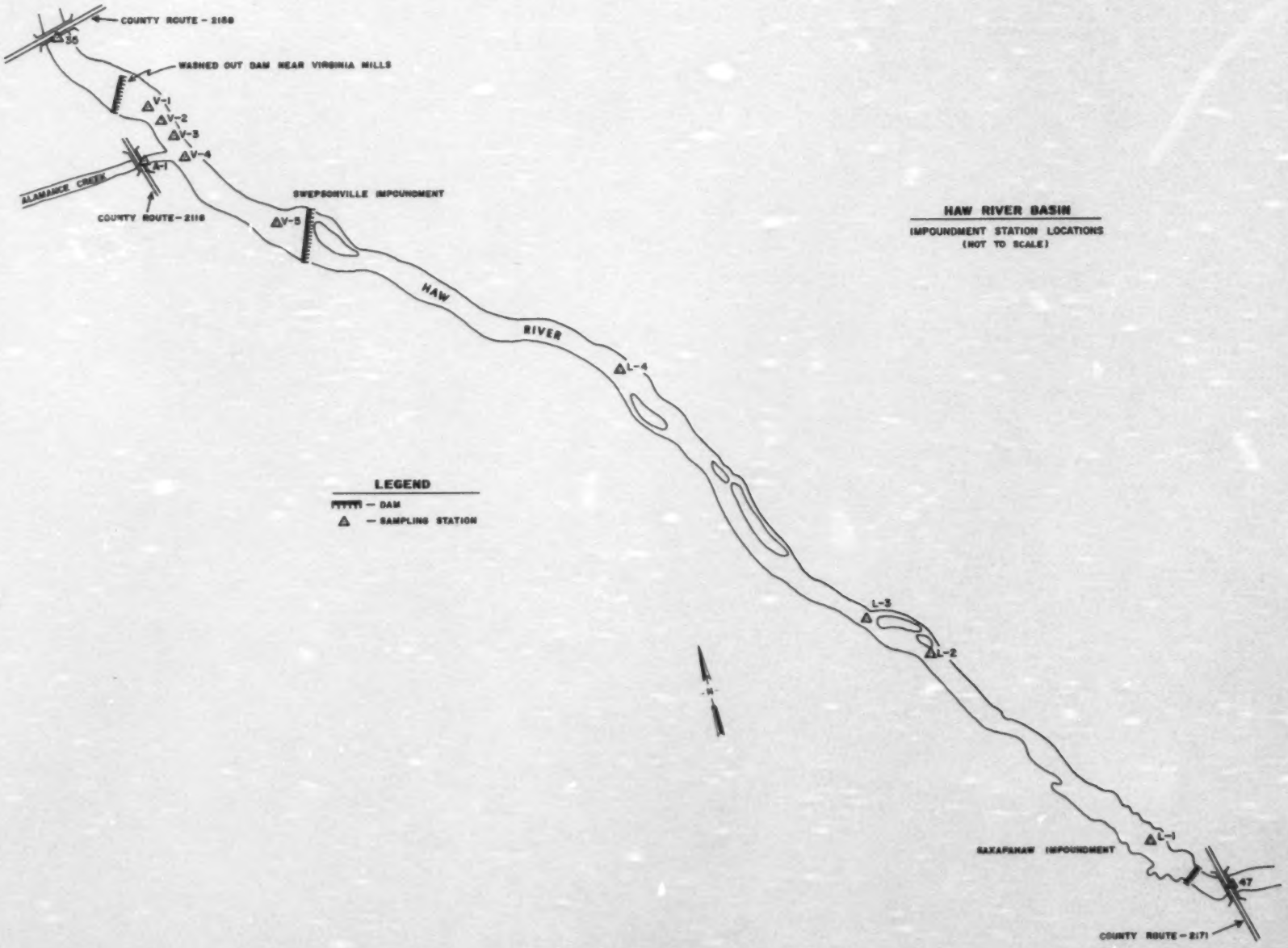


STATION 35

LONG TERM BOD

(BOD vs DAY)


HAW RIVER BASIN
STATION LOCATIONS
U.S. 158
HAW
RIVER
U.S. 29
U.S. 220
U.S. 70
INT 85
U.S. 421
GREENSBORO
BURLINGTON
MEBANE
ORANGE CO
DURHAM
GUILFORD CO
ALAMANCE CO
CHAPEL HILL
PITTSBORO
U.S. 15-501
U.S. 64
N
LEGEND
SAMPLING STATIONS
RESERVOIRS
5 0 5 10 15 20
SCALE IN MILES


COUNTY ROUTE - 2158
S6
WASHED OUT DAM NEAR VIRGINIA MILLS
V-1
V-2
V-3
V-4
ALAMANCE CREEK
L-1
COUNTY ROUTE - 2116
SWEPSONVILLE IMPOUNDMENT
V-5
HAW
RIVER
L-4
L-3
L-2
N
L-1
SAXAPAHAW IMPOUNDMENT
47
COUNTY ROUTE - 2171
LEGEND
— DAM
— SAMPLING STATION
HAW RIVER BASIN
IMPOUNDMENT STATION LOCATIONS
(NOT TO SCALE)